

DETAILED ACTION

The Reply filed by Applicants on 04/08/2011 is hereby acknowledged. The cancellation of claims 2-3, 9-10, 17-19, and 26-33 without prejudice is hereby acknowledged. The addition of new claims 35-40 is hereby acknowledged. Claims 1, 4-8, 11-16, 20-25 and 34-40 are pending and examined herein on the merits.

Claim Rejections - 35 USC § 101

Applicant's arguments, see page 7 of response, filed 04/08/2011, with respect to nonstatutory subject matter have been fully considered and are persuasive when taken together with the claim amendment specifying that the plant of the claim comprises a cassette. The rejection of claim 21 as being drawn to nonstatutory subject matter has been withdrawn.

Claim Rejections - 35 USC §101 and 112

Applicant's arguments, see page 7 of response, filed 04/08/2011, with respect to improper method claims have been fully considered and are persuasive when taken together with the claims amendments reciting a positive recitation of a method step in claim 7 and the clarification of claims 20 and 25 as product claims. The rejection of claims 7 and 20 and 25 under 35 USC 101 and 112 has been withdrawn.

Claim Rejections - 35 USC §112 2nd paragraph

Applicant's arguments, see pages 7-8 of the response, filed 04/08/2011, with respect to indefiniteness have been fully considered and are persuasive when taken together with the claim amendment. The rejection of claim 12 under 35 USC 112 2nd paragraph has been withdrawn.

Claim Rejections - 35 USC § 102

Applicant's arguments, see page 8 of the response, filed 04/08/2011, with respect to claim 7 being rejected under 35 USC 102 as being anticipated have been fully considered and are persuasive when taken together with the claim amendment specifying that the cassette is transformed into a *Eucalyptus* plant genome. The rejection of claim 7 under 35 USC 102 as being anticipated by Kobayashi et al has been withdrawn.

Claim Rejections - 35 USC § 103

Applicant's arguments, see pages 9-14, filed 04/08/2011, with respect to claims 7-8, 11-16, 20-21, 24-25, and 34-40 have been fully considered and are persuasive when taken together with the claim amendments limiting the plants, plant cells and seeds to *Eucalyptus* plant species. The rejection of claims 7-8, 11-16, 20-21, 24-25, and 34-40 under 35 USC 103 as being obvious over Kobyashi et al in view of Cameron-Mills has been withdrawn.

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The following grounds of rejection are either maintained from the previous office action, or are new grounds of rejection that have been necessitated by the claim amendments and/or entry of new claims.

Claim Rejections - 35 USC §112-4th paragraph

The following is a quotation of the fourth paragraph of 35 U.S.C. 112:

Subject to the [fifth paragraph of 35 U.S.C. 112], a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

Claims 12, 14-15, 20, 22-23, 25, 34, 36-37, 39 are rejected under 35 U.S.C. 112, 4th paragraph, as being of improper dependent form for failing to further limit the subject matter of the claim upon which it depends, or for failing to include all the limitations of the claim upon which it depends.

Claim 12 recites the limitation "wherein the Eucalyptus plant cells are from any part of the plant". Since the parent claim was not limiting as to where the plant cells come from, and claim 12 does not limit where the plant cells come from, claim 12 fails to further limit the subject matter of claim 8.

Claim 14 recites the limitation "wherein the modified Eucalyptus plant is a cell, an organ, a tissue, a seed, the entire plant, or its derived plants". Since the normal understanding of the term "plant" is not considered in the art to include only organs of the plant or a single cell, claim 14 broadens the scope of claim 13, from which it depends, indeed, even Applicants own definition of the term in

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paragraph 50 of the instant specification does not include its derived plants and therefore, broadens the scope based on the definition in paragraph 50 of genetically modified plant.

Claims 15, 20-23, 25, 34, and 36-37 all recite directly or indirectly "One or more expression cassettes according to claim 1" or "One or more expression cassettes according to any one of claims 1, 4, 5, o 6". However, amended claim 1 recites "A gene expression cassette" and claims 4-6 recite "the cassette according to claim 1" clearly indicating a singular state and limiting the claim to a single gene cassette. Therefore the recitation of more than one cassette broadens the scope of the claims to include embodiments that are not permitted by the parent claim. It is suggested to Applicant to overcome this portion of the rejection to amend the claims to state ---wherein at least one of the cassettes is the cassette according to claim 1--- in order to claim embodiments with more than 1 cassette.

Claims 20, 25 and 39 are product claims that recite an intended use for the products. Since the intended use does not impart a structural difference for the product, the intended use does not impart a claim limitation, and the claims therefore fail to further limit the parent claims from which they depend.

Applicant may cancel the claims, amend the claims to place the claims in proper dependent form, rewrite the claims in independent form, or present a sufficient showing that the dependent claims complies with the statutory requirements.

Claim Rejections - 35 USC §112-2nd paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 21 recites the limitation "the cassette" in line 3, however, claim 15 recites "one or more expression cassettes" rendering the term "the cassette" indefinite. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 4-6 remain rejected and claim 35 is rejected under 35 U.S.C. 102(b) as being anticipated by Kobayashi et al (2002 Plant Cell Physiology 43:1259-1265).

The claims are drawn to an expression cassette comprising a gene encoding UDP-D-glucuronate carboxylase involved in the biosynthesis of hemicelluloses such as xylans.

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Kobayashi et al teach the isolation and characterization of the UDP-D-glucuronate carboxylase from pea and the overexpression of said gene in *E. coli* cells wherein the gene is known to be involved in biosynthesis of xylans.

Response to Arguments

Applicant's arguments filed 04/08/2011 have been fully considered but they are not persuasive.

Applicants urge that Kobayashi et al do not teach the claimed expression cassette and that Kobayashi is directed to the cloning and introduction of a cassette in *E. coli* and is therefore distinct from the claimed subject matter directed to a cassette that is introduced into *Agrobacterium tumefaciens*, for expression in *Eucalyptus* (See page 8 of response).

This is not persuasive because Applicant has not provided any evidence that the expression cassette taught by Kobayashi et al is any different from the expression cassette of the instant claims. Rather, Applicant claims and cites an intended use of the product as reliance on differing from the prior art. An intended use cannot be relied upon where the intended use does not change the structure of the product. In the instant case, the expression cassette inserted into *E. coli*, may also be inserted into *Agrobacterium* and may also be expressed in *Eucalyptus*, or "for expression in *Eucalyptus*".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-6 and 22-23 remain rejected and claim 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (2002 Plant Cell Physiology 43:1259-1265 in view of Cameron-Mills et al (US Patent 6031155)).

The claims are drawn to an expression cassette comprising a gene encoding UDP-D-glucuronate carboxylase involved in the biosynthesis of hemicelluloses such as xylans. The claims are also drawn to genetically modified seeds comprising said cassette.

Kobayashi et al teach the isolation and characterization of the UDP-D-glucuronate carboxylase from pea and the overexpression of said gene in *E. coli* cells wherein the gene is known to be involved in biosynthesis of xylans. Kobayashi et al also state "The authors discussed that the Golgi-bound UXS may be a part of a multienzyme complex involved in xyloglucan synthesis" (see page 1263 1st paragraph), and "Substantial information has been accumulated on the structure and property of the individual component of plant cell walls, however, little is known about their interactions and physiological functions in muro.

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Mutant plants having altered composition in cell wall polymers are promising tools in elucidating these aspects" (see page 1263, 2nd paragraph).

Kobayashi et al do not teach transforming an *Agrobacterium* with said construct or transforming plants with said construct.

Cameron-Mills et al teach the transformation of plants with cell wall degrading enzymes such as endoxylanase that are part of the hemicellulose biosynthetic pathway and alter xylan synthesis, (see claims 1-9, for example) and methods of transforming a plant cell (see claim 30, 33 and 37, for example) and transformed plants therefrom (see claim 29, for example) and plant regeneration from said transformed cells (see 2nd paragraph under Gene Transformation Methods, for example), which includes seeds therefrom (see Example 5, for example) wherein *Agrobacterium* are transformed with said cassette (see paragraphs 1-2 under "Agrobacterium-Mediated Transformation" for example).

Given the state of the art and the disclosures by Kobayashi et al and Cameron-Mills et al, it would have been obvious to one of ordinary skill in the art to transform a plant using *Agrobacterium*-mediated transformation as taught by Cameron-Mills et al with the construct taught by Kobayashi, and one of ordinary skill in the art would have been motivated to do so based on the disclosure by Kobayashi indicating that the characterized gene is involved in hemicellulose formation and the statements suggesting that down-regulating such genes in plants would help elucidate protein interactions in plants. One of ordinary skill in the art would have a reasonable expectation of success given the demonstration by Cameron-Mills et al of the successful transformation of plants with cell wall

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degrading enzymes. Accordingly, the claims as written are obvious over Kobayashi et al in view of Cameron-Mills et al.

Response to Arguments

Applicant's arguments filed 04/08/2011 have been fully considered but they are not persuasive.

Applicants urge that Cameron-Mills are directed to barley genes solving a different problem from that of the instant invention and that Cameron-Mills do not use Agrobacterium as required by the instant claims and therefore teaches away from the instant invention (see pages 9-10 of response).

This is not persuasive because as noted above, the recitation of "which is cloned into a transformation binary vector and introduced into bacterium *Agrobacterium tumefaciens*" is an intended use of a product of the product claim and does not properly limit the claim. The expression cassette of the instant claims is not required to be transformed exclusively by means of Agrobacterium, firstly, because the claims are drawn to products and not methods, and secondly, because the product itself could be used in a variety of ways. Additionally it is noted that none of the claims in the above rejection are drawn to *Eucalyptus* plants or cells, and therefore are generically drawn to any expression cassette and any genetically modified plant seed comprising said cassette, respectively.

Applicants urge that one of ordinary skill in the art would not have combined the references because achieving plant transformation is difficult (see pages 10-14).

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This is not persuasive because plant transformation is well-known and standard in the art. Numerous examples of successful plant transformation studies have been conducted, and certainly transforming plants with plant genes (such as the pea gene of the instant invention and taught by Kobyashi) are generally recognized to be able to be transformed into other plant species with a high degree of success. It is noted that both art citations by Applicant apply to the transformation of woody plants, and not to plants in general. For that reason, it is agreed that transforming *Eucalyptus* with the gene in question is not obvious over Kobayashi et al in view of Cameron-Mills. However, it is further noted, that these results indicate that a predicted phenotype may be difficult, and not that overexpressing a gene is difficult. Therefore the withdrawal of the 103 over the claims reciting *Eucalyptus*, is as a result of there being no reason for one of ordinary skill in the art to specifically select *Eucalyptus*, and not due to the argument that it is unpredictable to transform plants with the genes of the instant invention.

Claims 7-8, 11, 13, 16, 24, 38 and 40 are objected to for depending from rejected claims but would be allowable if rewritten in independent form.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is

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filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRENT T. PAGE whose telephone number is (571)272-5914. The examiner can normally be reached on Monday-Friday 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on (571)-272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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